

Name: \_\_\_\_\_

Date: \_\_\_\_\_

A2CC: Geometric Sequences and Series

Do Now:

1. Given the sequence 3, 9, 27, 81, ...

(a) Find the tenth term.

(b) Can you write a formula to help you find any given term of the sequence?

A sequence is **geometric** if the ratio of consecutive terms are the same (multiply by a nonzero constant). A geometric sequence comes in the form  $a_1, a_1r, a_1r^2, a_1r^3, \dots$  where  $a_1$  is the first term and  $r$  is the common ratio. The  $n$ th term of a geometric sequence is  $a_n = a_1r^{n-1}$ . If the geometric sequence is finite, the sum of the first  $n$  terms or the  $n$ th

partial sum is  $S_n = \frac{a_1(1-r^n)}{1-r}$

1. Determine if the following sequences are geometric.

(a) 5, 10, 20, 40, ...

(b) 1, 2, 6, 24, ...

2.. Write a rule for the  $n$ th term of the geometric sequence  $6, -3, \frac{3}{2}, -\frac{3}{4}, \dots$  and find  $a_6$ .

3. Find the 7<sup>th</sup> term of the sequence 2, 6, 18, 54, ...
4. Given that  $a_1 = 5$  and  $a_2 = 15$  are the first two terms of a geometric sequence, determine the values of  $a_3$  and  $a_{10}$ . Show the calculations that lead to your answers.
5. Find the sum of the first 8 terms of the sequence -5, 15, -45, 135, ...
6. Write the first five terms of the geometric sequence whose first term is  $\frac{1}{5}$  and whose common ratio is  $-\frac{1}{5}$ .

7. Find the 15<sup>th</sup> term of the geometric sequence whose 1<sup>st</sup> term is 20 and whose common ratio is 2.

8. The first term of a geometric sequence is 8, and the second term is 4. Find the fifth term.

9. The 4<sup>th</sup> term of a geometric sequence is 125 and the 10<sup>th</sup> term is  $\frac{125}{64}$ . Find the 14<sup>th</sup> term.

10. Find the 7<sup>th</sup> term of the geometric sequence whose third term is  $\frac{16}{3}$  and whose fifth term is  $\frac{64}{27}$ .

11. Which term of the geometric sequence 2, 6, 18, ... is 118,098?

12. The second and fifth terms of a geometric sequence are 10 and 1250 respectively. Is 31,250 a term of this sequence? If so, which term is it?

13. Find the sum of each:

(a) 1, 3, 9, ..., 2187

(b)  $1, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \dots, -\frac{1}{512}$

14. In a geometric sequence, it is known that  $a_1 = -1$  and  $a_4 = 64$ . The value of  $a_{10}$  is

(1) -65,536

(3) 512

(2) 262,144

(4) -4096

15. Generate the next **three** terms of each geometric sequence defined below.

(a)  $a_1 = -8$  with  $r = -1$

(b)  $a_n = a_{n-1} \cdot \frac{3}{2}$  and  $a_1 = 16$

(c)  $f(n) = f(n-1) \cdot -2$  and  $f(1) = 5$

16. Generate the next three terms of the geometric sequences given below.

(a)  $a_1 = 4$  and  $r = 2$

(b)  $f(n) = f(n-1) \cdot \frac{1}{3}$  with  $f(1) = 9$

(c)  $t_n = t_{n-1} \cdot \sqrt{2}$  with  $t_1 = 3\sqrt{2}$